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ABSTRACT

A study examined the factors affecting Connecticut high school students' decision to enroll in technology education (TE). Data were collected from the following sources: focus group interviews with 134 boys and 107 girls from TE classes at 4 high schools across Connecticut and a quiz administered to 320 boys and 196 girls in both academic and TE classes. Many reasons cited as motivations for enrolling in TE, including the attraction of hands-on learning, exposure to technology outside the school, and interest in a technological career, applied equally to boys and girls. Several factors, however, were directly related to gender equity. Because of the sex stereotypes associated with many technological jobs, for example, only those girls who were willing to be "pathbreakers" and challenge stereotypes were likely to enroll in TE. Many girls interviewed expressed a reluctance to be "one of the few girls" in TE. The following actions were recommended to increase enrollment in TE: provide better information to middle school students about TE course offerings in high school, find role models for girls in TE, and have TE teachers develop strategies to attract more girls to their classes. (Appended are the quiz, interview schedule, and TE enrollment data.) (MN)

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ED 376 309

BUILDING THEIR FUTURE II:

HIGH SCHOOL GIRLS IN TECHNOLOGY EDUCATION IN CONNECTICUT

by

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This project could not have been completed without help from administrators and teachers at the four schools we studied. They assisted us by scheduling student interviews and administering the quiz to their students. Their cooperation and support was greatly appreciated.

Above all we are grateful to the students who participated in our interviews and spoke honestly about their experiences and interests. We hope that those who read this report will share it with other students who may have similar stories to tell.

We would also like to extend a special thanks to Gail Williams for her work on the production of this report and to Leslie Brett for her support and guidance in this project.

PREFACE: SCHOOL-TO-WORK TRANSITION

In recent years, educators and political leaders have become increasingly concerned with the lack of connection between schools and the world of work. With the high school drop-out rate growing and many high school graduates not finding jobs or not seeking a college education, young people are not prepared for jobs which provide a growing income.

This lack of training is particularly important for women, since they are still heavily concentrated in low paying jobs. Women earned 71 cents for every dollar earned by men and made up 73 percent of all people over 18 years of age whose incomes were below poverty level in 1991 (*Source: Bureau of Labor Statistics*). At the same time, more women are working outside the home and a growing percentage of women are the sole support for their families.

Therefore, efforts to improve training are crucial for female students, particularly those who do not plan to go to college. As Senator Paul Simon, sponsor of the federal School-to-Work Opportunities Act pointed out in supporting the legislative initiative:

> "Seventy-five percent of those who go to high school are not going to be getting bachelor's degrees, and yet we invest a disproportionate amount of our resources in the 25 percent" (*Congressional Quarterly, February 12, 1994*).

Supporters of the Act point out that schools currently provide little assistance for high school students who do not plan to go to college. Secretary of Labor Robert Reich said:

> "We are the only major industrialized nation with no formal system for helping our young people...make the transition from the classroom to the work place" (*Congressional Quarterly, August 7, 1993*).

According to President Clinton, one of his administration's top goals is to help the nation's schools prepare students for work.

> "We have to have rigorous academics and practical learning. We have to tie the work place to the learning environment in high school for young people who know they are not going on to four year colleges...We have an opportunity to do something that Americans have resisted for too long - which is to merge instead of keep divided our notion of vocational education and academic education" (*NY Times, 2/23/94, p.B7*).

The School-to-Work Opportunities Act authorizes grants for educators, employers, and labor representatives to develop partnerships to allow high school juniors and seniors to go to school part-time and to work part-time. Students will receive high school diplomas, postsecondary training, and certificates of competency in their chosen fields.

Legislation passed in Connecticut sets up a system to integrate school and work-based learning. The system would provide a number of different pathways and its focus would be a new Connecticut Career Certificate. Each pathway consists of school-based and work-based opportunities, supported by career development and other connecting activities.

The importance of career information is stressed by the U.S. Department of Education. In their publication, *What We Must Do To Get Students Ready*, career counseling is presented as the key to forging the connection between school and work. Yet it is also pointed out that career guidance is one of the most neglected areas in American schools today.

The U.S. Department of Education publication also points out that many students lack a sense of economic realities.

> "The problem is - too many of our students just don't see the relevance of school. Try as they might, they simply cannot connect long, dreary hours of books, assignments, drills and tests with what, for them, is the real world 'out there'... Seldom do fresh-from-school youngsters with limited academic and technical skills connect with anything but minimum wage chore jobs. Good jobs require some postsecondary training or in that frustrating catch-22 sense, '...several years of work experience.'...As a result, far too many of our youth are dead-ended before they even get started" [pg. 1].

In order to improve the links between learning and jobs, teachers have to provide information about careers in the classroom and guidance counselors need to discuss available options with students beyond the goal of going to a four year college. There must be a link between the choice of vocational electives and career goals.

However, an examination of the system of vocational education currently being offered in Connecticut's schools demonstrates how far we have to go to achieve these goals. Beyond the issue of linking vocational and academic education, however, is the problem of gender equity. While both boys and girls in our high schools suffer from the lack of connection between school and work, girls are losing the chance for high wage technological careers because of their low participation rates in technology education classes.

Any program designed to prepare young people for good jobs must also address the imbalance in the participation rate of females and women in technical training and provide opportunities and encouragement for females to consider nontraditional careers. This stage of our research project analyzes the factors which encourage and discourage female participation in technology education in high school and suggests strategies to move toward gender equity.

I. INTRODUCTION

In the first part of this research project, we examined the participation of girls in technology education, concentrating on their middle school experiences which was their first exposure to the subject. We also began a preliminary examination of why so few girls follow up that initial exposure by electing to take technology education in high school. (See *Building Their Future I*)

In this report, we follow up that research by interviewing high school students to determine why, from the students' perspective, there is such a wide gender gap in participation rates in technology education. *Building Their Future I* highlighted a survey of high school students in technology education which examined the factors influencing students' choice and the differences between boys and girls. In order to explore the reasons why some students chose not to take technology education, however, we needed to talk to high school students and let them express their thoughts and feelings directly. We, therefore, decided to make the major emphasis of this stage of the research a series of focus group interviews with high school students.

We interviewed both boys and girls, some of whom were taking technology education and some who were not. This strategy enabled us to look at the factors encouraging or discouraging students from choosing technology education as an elective, and in particular to examine the differences between boys and girls which could account for the huge differences in participation.

We asked students what they liked and disliked about various subjects, particularly technology education, and how they decided what electives to take. If some girls were discouraged from taking technology education, we wanted to explore the reasons. The focus group format allowed us to follow up statements with more detailed discussion and exchange of ideas.

We were interested in whether boy and girls chose to take technology education for different reasons and the important influences on their choices. We wanted to assess the impact of teachers and guidance counselors on their decisions, as well as parents and other factors outside of school.

We wanted to determine whether stereotypes about appropriate careers for women were still operating in students' minds. We asked students to tell us about what they planned to do after high school and who they talked to about the future. We wanted to determine how well informed students were about technological careers and the various options for further training available to them after high school.

We were also interested in the extent to which students showed an understanding of the economic realities involved in earning a living and paying for further education and training, as well as the relative earnings and promotion prospects of various occupations. In particular, were students aware of the realities facing women in the work force? In order to get a more concrete measure of their knowledge, we gave all students in the classes we interviewed a short quiz with multiple choice questions about economic facts. We also discussed these issues in the focus group interviews.

II. SUMMARY OF FINDINGS

We explored the reasons why some students decide to take technology education and some do not, with particular attention to the differences between boys and girls. While both boys and girls are attracted to technology education for many of the same reasons, we found significant differences between girls who do not take technology education.

Why Do Some Students Decide To Take Technology Education?

- Both boys and girls are attracted to technology education because they enjoy working with their hands and like the independence and chance for creativity provided by these classes.

- An interest in technology education was often encouraged by relatives or friends outside of school. This kind of encouragement was particularly important for girls, because boys are more likely to have experience with technology.

- Girls taking technology education shared a sense of being "pathbreakers" who could prove that girls were as good as boys at nontraditional subjects. They didn't mind being one of the few girls in a class and did not feel the boys made it difficult for them, although they did worry about teachers treating them differently.

- Girls taking technology education rejected stereotypes about appropriate subjects or jobs for women, but discussions with boys and girls who do not take technology education revealed that stereotypes are still powerful. While both boys and girls rejected the idea that males are inherently better at some subjects or jobs, the fact that there are few females in nontraditional occupations was often cited as a reason for girls not to take technology education or consider a technological career.

- Interest in a technological career was not an important factor in many students' decisions about vocational electives, although girls taking technology education seemed to have a clearer sense of career goals than boys.

- While some students were encouraged to take technology education as a result of their middle school experience, the most common response was that it had little impact because what they did in middle school was not comparable to the range of classes available in high school. As a result, girls were generally not aware of what was available in high school and were not being encouraged by their middle school experience to challenge stereotypes and explore nontraditional subjects.

- Many students reported getting little advice or information about technology education from their guidance counselors. This lack of information was particularly difficult for girls to overcome, since they are less likely to have experience with technology outside of school and must be willing to fight stereotypes about appropriate subjects for girls. Where guidance counselors did play an active role, some girls reported that they were discouraged from taking technology education.

Why Do Some Students Decide Not To Take Technology Education?

• Girls who chose not to take technology education were often reluctant to take classes where they would be one of the few girls. While only a few girls openly accepted stereotypes about appropriate careers for women, many of the girls felt uncomfortable with the picture of themselves in nontraditional jobs. They lacked confidence in their abilities and worried about the reaction of friends and family.

• Many students lack knowledge of what technological careers are available and what they involve. This lack of knowledge is an important factor for girls, since they have less experience with technology outside of school. Better information could have broken down stereotypes about "male occupations" and fears about the physical demands of jobs, since high tech areas like computer aided design and manufacturing do not involve heavy lifting or high risk of injury.

• Many students lack a sense of economic realities which could inform their choice of careers and help them make reasonable plans for further education and training after high school. Girls seemed unaware of salary or promotion prospects of traditional careers for women and less concerned with economic realities than boys.

• The quiz results demonstrate that boys and girls share misconceptions about how long women are likely to spend working, the level of earnings they can expect, and the relative salaries of traditional jobs for women.

• Students often failed to make the connection between what they were doing in class and technological careers. Most students had no opportunities to get work experience related to their career choice. Girls had little contact with female role models who could give them information about technological careers and break down stereotypes.

III. METHODOLOGY

In order to gain information on the status of students in technology education, we visited four high schools across the state. We chose a range of different schools, including one suburban, one rural, one urban, and one school in a medium sized industrial town.

We picked two technology education classes in each high school, usually drafting or graphic arts, and two academic classes, mainly English or social studies. We conducted focus group interviews with the boys and girls separately, typically in groups of 8 or 9 students. We conducted a total of 32 interviews with 241 students, including 134 boys and 107 girls. In addition, we also gave students a quiz about the economic realities facing women in the work force. A total of 516 students in both academic and technology education classes took the quiz, including 320 boys and 196 girls (See Appendix A for quiz).

The scarcity of girls taking any technology education class was brought home to us immediately on trying to set up the interviews in the four participating high schools. There were only one or two classes in any of the high schools with as many as four or five girls and most classes had at most two or three girls (for details of statewide enrollments in technology education, see Appendix B).

As a result, we interviewed considerably more boys taking technology education, a total of 60 boys and 22 girls, although we talked to both boys and girls in academic classes who were also taking technology education courses.

We started by asking students about their career plans and then went on to discuss their favorite subjects, their experiences in technology education, and their feelings and beliefs about gender issues. We finished by asking each individual who they talked to about the future and their relations with parents, guidance counselors, and teachers (See Appendix C for interview protocol).

In the focus group interviews, we tried to give students the opportunity to speak for themselves. Often education research fails to ask the people most directly affected about their feelings and beliefs. We had some heated and enthusiastic discussions, often with disagreements between students about controversial issues. In our findings, we quote students directly as much as possible while trying to give a sense of the most common attitudes and comments.

IV. FINDINGS

Why Do Some Students Decide To Take Technology Education?

Our interviews with both boys and girls taking technology education uncovered a number of different factors operating in students' choice of electives. Some of these factors effect boys and girls the same way and concern school policy on scheduling electives, the attitude of guidance counselors, or the student's background and interests. Several factors, however, can be directly related to gender equity.

Attraction of Hands-On Learning

Both boys and girls are attracted to technology education because they enjoy working with their hands and like the independence and chance for creativity provided by these classes.

A major factor affecting all students was the attraction of hands-on learning. Students who enjoyed working with their hands and had confidence in their ability to design and make things were attracted to technology education. They also liked the independence and chance for creativity offered by such classes.

> *"It's different, you don't sit in class in a desk and the teacher's at the blackboard. You actually do something that's interesting. It's not like sitting in an English or math class all day." [girl in technology education class (TE)]*

> *"You can work on your own. You don't really have assignments. You can design what you want without the teacher telling you-you have to do this or that." [girl in TE]*

> *"In order for me to learn, I have to DO IT." [girl in TE]*

> *"When you have graphics first period, it wakes you up." [girl in TE]*

We did not find any particular connection between technology education and other subjects like math or science. Students taking technology education seemed to be divided almost equally between those who liked and disliked math, although there were more students who said they liked science than disliked it.

Exposure to Technology Outside the School

An interest in technology education was often encouraged by relatives or friends outside the school. This kind of encouragement was particularly important for girls, because boys are more likely to have experience with technology.

The students' interest in technology sometimes was sparked by a family member or friend who got them involved in some aspect of technology outside of school. Students mentioned helping their father fix things or having an uncle or family friend who is an electrician or engineer. One girl wanted to help her brother build a car, so decided to take autobody mechanics. When she couldn't get in that class, she took drafting instead. Several students mentioned an interest in computers which was encouraged at home.

The encouragement coming from outside the school seemed particularly important to the girls who decided to take technology education. Some of the girls mentioned working with a relative on a technical job, like fixing cars or household repairs or going with them to a work site. Others mentioned brothers or sisters who had taken technology education and encouraged them. These contacts seemed to reassure them that girls are able to understand technology and do well in technological fields.

In contrast, while some of the boys mentioned working with their fathers or talking to siblings or other relatives, this rarely seemed a key factor in deciding to take technology education. These contacts were almost taken for granted by many of the boys, suggesting that boys are much more likely to be introduced to technology outside the school and may need less reassurance about their ability to succeed.

Girls as "Pathbreakers"

Girls taking technology education shared a sense of being "pathbreakers" who could prove that girls were as good as boys at nontraditional subjects. They didn't mind being one of the few girls in a class and did not feel the boys made it difficult for them, although they did worry about teachers treating them differently.

All of the girls interviewed in technology education classes were outnumbered by the boys, typically being one of two or three girls with fifteen or more boys in the class. Nearly all of these girls said that being in the minority didn't bother them. They seemed to share a sense of being "pathbreakers" who could prove that girls were at least as good, if not better than boys, at nontraditional subjects. Quite a few actually liked being one of the few girls.

> *One girl likes doing things that "girls are not supposed to like." She would like to see things changing from "a man's world." [girl in TE]*

> *One girl, who is the only girl in her technology education class, said she didn't mind. "You just have to be yourself and it doesn't bother you." [girl in TE]*

> *One girl resents the fact that women are assumed to be technically incompetent. "When a woman goes into an auto repair place, the mechanics assume she can't understand and doesn't know what she is talking about." She likes showing the boys that she can do it better. "Women are stronger than men." [girl in TE]*

Most of the students we interviewed said they enjoyed their technology education classes and were glad they had chosen or been assigned them as electives. Most of the girls said they were encouraged by the attitude of teachers and male students. In contrast to what we found in middle school (see *Building Their Future I*), girls did not report resistance from boys in their technology education classes.

> *"The boys like having us (girls) in class - they're always willing to help out. They may wonder why I take the class but they've never given me a hard time." [girl in TE]*

Both boys and girls taking technology education rejected the idea that girls who are good at math, science or technology are in any way strange or weird.

Girls more often reported resistance from their female friends or relatives.

> *"Even now I talk to some of my friends and I tell them the classes I'm taking and they're like, 'how can you take those classes?' And then I'm like, why don't you try it and they're like 'no, no I'm not gonna try it.' They don't even want to have any part of it." [girl in TE]*

Quite a few girls mentioned technology education teachers who had encouraged them in class and were pleased when they did well. There were a few cases, however, where girls felt that teachers were treating girls differently. The girls complained just as strongly about teachers who they felt were trying to give girls a break as about teachers who did not give them enough help or allowed boys to do more.

> *"In my architectural drafting class, Mr. ___ treats the girls much different from the guys. I don't think he expects as much from the girls." [girl in TE]*

> *"If he wanted something done he would ask one of the guys to do it. We (the girls) didn't really have a clue, but he didn't really give us a chance either." [girl in TE]*

> *"It was such a big class, if you don't make yourself known, he just walks right by." [girl in TE]*

> *"Last year he would grade the girls a lot easier than the guys and they'd get mad." [girl in TE]*

A Vicious Circle

Girls taking technology education rejected stereotypes about appropriate subjects or jobs for women, but discussions with boys and girls revealed that stereotypes are still powerful. While both boys and girls rejected the idea that males are inherently better at some subjects or jobs, the fact that there are few females in nontraditional occupations was often cited as a reason for girls not to take technology education or consider a technological career.

Most of the girls taking technology education rejected stereotypes about some occupations being more appropriate for men than women. The most common comment was, "If they like it, they should go into it." The most common reservations they expressed concerned issues about the safety of certain kinds of jobs, like construction work, or not being strong enough to lift heavy loads.

In contrast, there were a few boys who were willing to speak up in support of such stereotypes.

> *"Boys are better at technology...it's just more of a guy's thing ... you don't want to see a woman out there with a hard hat on." [boy in academic class (A)]*

> *Speaking of why girls shouldn't take technology education, one boy said, "They're afraid to use the machine - they might be cut, they don't want to get dirty or break a nail." [boy in TE]*

When these boys spoke up, however, the rest of the boys did not necessarily agree. Sometimes a few boys would openly disagree, saying that some girls were just as good as boys in nontraditional subjects or that women should be able to do any career they wanted.

> *"Girls can be just as good in construction. I found that out in my carpentry class. There is no reason women have to just stay home and cook." [boy in A]*

> *"I know a woman who can rebuild jet engines. There are not many women like that, but they are as good as men if they want to do that kind of work." [boy in A]*

Most of the boys did not offer any comment and seemed uncomfortable with the subject.

One response to the question of whether some careers or subjects were more for boys than girls was an assertion of the fact that there are few females in nontraditional occupations. It seemed to be a vicious circle: because few women are in construction, it was better for men to become construction workers.

> *"It's hard for a woman to go into one of those fields." [boy in A]*

However, when we followed up such assertions with questions about whether males were inherently better at some occupations or subjects, that kind of statement was almost always rejected. Only one boy openly maintained that boys had more ability. Boys were much more likely to point out the same kind of reservations expressed by the girls; that some jobs were dangerous or involved heavy lifting. The following discussion was typical:

> *When I mentioned construction, one of the boys pointed out, "There are women in construction. There may be more men working in that area, but that doesn't mean women can't do it. They should do it if they want to." Another boy who wants to be a carpenter disagreed saying, "Construction involves a lot of heavy lifting, it's too tough for women... you don't see a lot of women garbage collectors, do you?" [boys in TE]*

> *In discussing whether boys are better at technological subjects, one boy said, "That's not really it. There is only one girl in this CAD class - they just don't want to do the subject but it's not that they can't do it." [boy in TE]*

This kind of reasoning was not restricted to boys. While most of the girls taking technology education rejected stereotypes about appropriate careers in very strong terms, a few girls clearly had trouble imagining themselves in nontraditional occupations and worried about facing disapproval or derision. They didn't question their ability to do the work, but worried about the reaction of other people.

> *"Every time I think of an architect I kinda think of a guy. You can tell someone you want to go into architecture and they're like, 'you do?' They say 'isn't that like more for a guy?'" [girl in TE]*

> *"I was thinking about being a tech ed teacher, but I'm like I can't do that because as soon as I walk in the school or the class that I'll be teaching they're gonna laugh at me and walk out. It's just generally known that only guys teach tech ed and women don't." [girl in TE]*

Interest in a Technological Career

Interest in a technological career was not an important factor in many students' decisions about vocational electives, although girls taking technology education seemed to have a clearer sense of career goals than boys.

Despite the vocational aspects of technology education, the desire to pursue a technological career was mentioned by surprisingly few students as the primary motivation for taking such a class. Out of eleven boys interviewed in one *Power and Energy* class, for example, four of the boys expected to go to technical school after finishing high school, in areas like plumbing or auto mechanics. They acknowledged that this technology education class was relevant to their career goals.

The other boys in the class, however, said they were taking it because they liked working with their hands, they liked the teacher, or the class fit into their schedule. One 12th grader doesn't want to go to college and has no idea what he will do when he finishes high school. An 11th and 10th grader in the class said the same thing. They said they were not interested in a technological career.

The pattern uncovered among the boys in this particular technology education class was quite common. Some of the students are planning on going to technical school and are taking the class because they are interested in technological careers. Some of the students plan to go to college, and among these, a small number are interested in engineering, architecture, or some related field which encouraged them to take technology education. The rest of the students have not decided on a career and have no idea what they will do on finishing school.

Even among students who were interested in technology-related careers, the relevance of their high school classes was not necessarily obvious to them. One boy who plans to go to college and eventually go into advertising did not seem aware that graphic arts courses might be relevant. He said he was taking the class because he liked using the machines.

This pattern seemed to apply to girls as well as boys taking technology education, although the girls seemed to have a clearer idea of career goals. There were very few girls who had no idea of what they wanted to do when they finished high school. This greater sense of direction may be related to the fact that girls in nontraditional areas have had to face stereotypes and give some thought to "appropriate" occupations, but it may also have to do with the small sample size (22 girls verses 60 boys).

Of the 22 girls we interviewed, ten were interested in technological careers, including three girls who wanted to be architects and four potential engineers. But as noted above, even girls who had taken quite a few technology classes and were proud of their abilities could not always picture themselves actually working in technical jobs. Some planned to pursue more traditional careers for women. One girl said her uncle was an electrician and she had talked to him about a technological career, but decided she was more interested in food service. The other two girls in this graphics class were planning to go into nursing and cosmetology.

Experiences in Middle School

While some students were encouraged to take technology education as a result of their middle school experience, the most common response was that it had little impact because what they did in middle school was not comparable to the range of classes available in high school. As a result, girls were generally not aware of what was available in high school and were not being encouraged by their middle school experience to challenge stereotypes and explore nontraditional subjects.

Since most students must take technology education as part of their exploratory vocational program in middle school, we expected that a positive experience in middle school would be a significant element in the motivation of students to choose technology education in high school. When we surveyed 737 technology education students as part of the first year of this research project, we found that only 12% of boys and 8% of girls picked "I liked my tech ed classes at the middle school" as one of the reasons why they decided to take technology education (See *Building Their Future I* for discussion of survey).

In our focus group interviews this year, we were able to follow up this question with high school students. The results were consistent with the numbers generated by the survey - only a few students said their middle school experiences were crucial, and they mentioned programs which included a wide range of different aspects of technology education, including the use of computers.

> *One boy said, "I really liked my drafting class in middle school and decided to take more."*
>
> *Another boy said, "I think that's what made me want to take a tech ed class in high school." [boys in TE]*
>
> *Two girls remembered taking woodworking, graphic arts and drafting and that clearly influenced them to take more. [girls in TE]*

The most common response, however, was that their middle school experiences had little impact because what they did in middle school was not comparable to the range of classes available in high school. Some of the middle school programs did not include the use of computers or the chance to see what is involved in graphic arts or CAD.

> *"I took it but it didn't really have any effect. I didn't take tech ed till my sophomore year." [girl in TE]*
>
> *"It was a required class with bits and pieces of tech ed, but it was just a short rotation with lots of other subjects - we didn't know the kind of things we could take here (high school)." [girl in TE]*
>
> *Three 9th grade girls who had been in middle school last year said they remembered taking only woodworking - making birdhouses. They hadn't used computers and didn't realize that CAD was available in high school. [girls in TE]*

In one case, their experience with technology education in middle school actually discouraged a few girls from taking more in high school. Their middle school teacher treated the girls differently from the boys, not letting the girls use some of the power equipment and assigning them different tasks. The girls resented this attitude and knew they could use that equipment as well as the boys. However, they didn't feel this was a common attitude among technology education teachers and went on to enjoy their classes in high school.

"I Never Walked Down This Hallway Before"

Many students reported getting little advice or information about technology education from their guidance counselors. This lack of information was particularly difficult for girls to overcome, since they are less likely to have experience with technology outside of school and must be willing to fight stereotypes about appropriate subjects for girls. Where guidance counselors did play an active role, some girls reported that they were discouraged from taking technology education.

In our high school survey, only 9% of the boys and 10% of girls picked "my guidance counselor said I should take it" as one of the reasons they decided to take technology education. When we asked students to identify the person or persons who most encouraged them to take technology education, of the 43% who chose to write in an answer under "other", the most common answer was "myself". Twenty-eight percent of the girls chose to write in "myself" as the sole response.

Our focus group interviews allowed us to follow up these results and try to get an understanding of the role of guidance counselors and the reason so many students chose to take technology education "by myself". The findings reveal a range of different roles for guidance counselors and differences in the freedom of choice for students, information available to students about various electives, and the connection between vocational classes and future careers.

At some of the high schools, guidance counselors seem preoccupied with college requirements. The students taking technology education told us that they chose their electives with little input from guidance counselors, who seemed relatively unconcerned with students who do not plan to go to college and are uninformed about elective choices. Students were allowed to chose their electives with little advice or discussion about the relationship between vocational classes and possible careers.

> *"I didn't know what the tech ed classes were all about. Guidance counselors sometimes suggest, 'why don't you try this or that', but they don't know anything about tech ed and don't suggest it. They don't explain what is available." [girl in TE]*

> *"They tend to be vague about electives. If you go to your guidance counselor in your sophomore or junior year and you say - I like math and science, I think engineering might be a cool thing to do - they are still stuck on what English course you are going to take next year. They don't say, you might want to take a look at these electives, we have a great CADKEY class that talks about design..." [girl in TE]*

Some of the students pointed out that guidance counselors had little information about technology classes.

> *"My counselor didn't seem to know that much about it. My freshman year I signed up for drafting and I didn't really know what it was, I just did it." [girl in TE]*

> *When asked whether guidance counselors knew about technology education, one boy said, "I don't think they have a clue." [boy in TE]*

Where guidance counselors did take a more active role, the results are very mixed. While some students said that their guidance counselor suggested they take technology education as an elective, there were others who said they were discouraged. For students who planned to go to college, the value of technology education for careers such as engineering or architecture did not seem to be acknowledged by guidance counselors.

> *"...at first when I came in my freshman year, I was scared and I didn't want to take any classes, just what she assigned me. My sophomore year I wanted to take graphics, just try something different, or drafting, and she said I should stick to my regular classes because you know I'm really intelligent and I'm gonna be going to college so I should just stick to college classes. So I listened. Then my junior year I took graphics and I loved it so my senior year I have three drafting classes." [girl in TE]*

While both boys and girls mentioned being discouraged by guidance counselors, fewer boys reported being discouraged and the reasons they were given by the counselors sometimes differed from those offered girls. Boys usually said that counselors wanted them to take another elective or stick to more academic subjects. Girls faced an attitude about what classes or careers are "appropriate" for girls.

> *"She always talked about me not getting into engineering. 'Do you know what you're getting yourself into, do you have any other interests?' - cause I was also interested in political science and she always pushed me more toward that but I said no, I want to do drafting." [girl in TE]*

> *"I don't think she understood what I was saying - she would suggest, 'why don't you take this or that', but she wouldn't listen to what I wanted. I had to sit there and make sure she wrote down this tech ed class." [girl in TE]*

> *"My guidance counselor discouraged me. She said, 'You don't really want to take it'. They don't say, 'Oh, you're a girl so you don't want to take it', but you know what they mean. My friend and I wanted to take a woodworking class and my counselor said to come back, she would have to see. So we went to the other girl's counselor. He pointed out that it was an all boys class, but he thought we could do it. My counselor was not too happy about it, but we signed up." [girl in A]*

This kind of attitude was often mixed with a lack of knowledge about what was available in technology education which could make it very difficult for girls interested in technological careers. These problems were revealed in a striking way in one class, where there were five girls taking drafting, three of them seniors. All three seniors planned to go to college and major in engineering. All three reported that guidance counselors did not suggest they take technology education, even though they expressed an interest in engineering. They had to search out their technology education classes because they were given little information.

Why Do Some Students Decide Not To Take Technology Education?

Students we interviewed in academic classes revealed a range of different reasons for choosing their electives, from having room in their schedules to the desire to pursue career goals. The most common reason students mentioned for not taking technology education was a lack of interest. Some students were interested in other vocational areas or were taking music or art classes which filled their available elective choices.

When we followed up this discussion about electives, however, we found considerable differences between boys and girls. Of course, we found more boys than girls in academic classes had taken or were taking technology education and some of these students were interested in technological careers.

Reluctance to Be One of the Few Girls

Girls who chose not to take technology education were often reluctant to take classes where they would be one of the few girls. While only a few girls openly accepted stereotypes about appropriate careers for women, many of the girls felt uncomfortable with the picture of themselves in nontraditional jobs. They lacked confidence in their abilities and worried about the reaction of friends and family.

A few of the girls we interviewed in academic classes were taking technology education and their attitude was consistent with the girls we interviewed in technology education classes. In general, they did not mind being one of the few girls in such a class and had positive feelings about going into a nontraditional career.

In contrast, many of the girls in academic classes were reluctant to take technology education and when we went beyond the surface explanation that they were not interested, they clearly felt uncomfortable about being one of the few girls in such a class or going into a nontraditional field.

A few girls openly accepted stereotypes about technology being inappropriate for women.

> *When girls in one class were asked whether they were taking technology education, one girl laughed and said, "No, we're girls." [girl in A]*

A more common response was not wanting to be in a class with all boys.

> *In one class, a girl said she had wanted to take a tech ed class, but, "I don't know...I didn't want to sit in the class with all guys." Another girl said, "I'd feel funny" and the rest agreed. [girls in A]*

> *In discussing the fact that they liked tech ed in middle school, one girl pointed out that everyone had to take tech ed, so its different from high school, where there are so few girls. "In middle school they did things for guys AND girls." [girl in A]*

> *One girl said she was interested in learning how to fix her car and thought of taking auto mechanics, but "There are too many guys in there." [girl in A]*

Along with feeling uncomfortable about being one of the few girls, there was also the feeling that girls would find it more difficult to do the work because boys had more technical experience.

> *One girl who did take a tech ed class last year said, "I always felt out of place...the boys knew what they were doing and they would say, 'you don't know how to do that'." [girl in A]*

The fact that nearly all technology education teachers are men led some of the girls to worry that the teachers would not support girls.

> *"They're on the guy's side because the guys know how to do it." [girl in A]*

This lack of confidence about their abilities was reinforced by the sense that most people see technology as a male-dominated field. When asked whether people think technology education is for boys, many girls said yes.

> *"I'd get interested (in tech ed) but then I'd be like, 'no, I can't do that because it seems like a guy thing.' You could do it, it doesn't matter what people say, but it seems real hard too." [girl in A]*

> *"Like in wood and metal...Guys have so much common sense when it comes to that subject and using the equipment and putting things together." [girl in A]*

> *"I'd be kinda proud of myself if I was in tech ed with all the guys." [girl in A]*

Similar to the girls who are taking technology education, some girls were concerned about the safety of technological jobs and the physical demands of jobs in areas like construction.

Most of the girls rejected the idea that girls were not as good as boys in any subject or that women were not capable of doing all kinds of jobs. At the same time, many girls were clearly uncomfortable with the picture of themselves in technological jobs. They were more "interested" in jobs like nursing or cosmetology because they were more familiar with such occupations.

Lack of Knowledge About Technological Careers

Many students lack information about what technological careers are available and what they involve. This lack of knowledge is an important factor for girls, since they have less experience with technology outside of school. Better information could have broken down stereotypes about "male occupations" and fears about the physical demands of jobs, since high tech areas like computer aided design or manufacturing do not involve heavy lifting or high risk of injury.

Even among those taking technology education, students often do not have a clear sense of what careers are available in technological fields or the connection between technology education classes in high school and future jobs. This was particularly important for students not planning on going to a four year college, since they often seemed unaware of options for shorter-term training programs in technological fields. Students were sometimes completely without a sense of direction.

Discussions with students in the focus group interviews about careers involving computer technology or engineering revealed confusion and uncertainty about what kind of jobs might be available and what kind of preparation was required.

While students might express an interest in computer science, they were not able to distinguish between word processing and programming or explain what a "computer technician" might do on the job. Many students did not seem aware that technology education classes which provided training in computer aided design and manufacturing might lead to jobs in high tech areas.

Students expecting to go to college and major in engineering seemed clearer about the possible options in computer science, but they did not necessarily see any connection with technology education classes in high school. For students not planning to go to college, questions about engineering were greeted with silence or questions about what it is. When asked, only a few students could describe the different kinds of engineers and the training required for such jobs. One girl responded that she wasn't interested in driving trains.

Considering the number of juniors and seniors in our interviews, we were surprised by the lack of knowledge of alternatives for different kinds of training, especially for students not planning on going to college. Even students who had a clear idea of what they wanted to do were not sure what kind of training they would need or how they would go about getting it. Students interested in construction were not familiar with apprenticeships or the role of unions in the industry.

> *When asked what he was going to do after high school, one senior said he was interested in carpentry. "I expect I'll go to technical school, but I haven't applied anywhere yet." [boy in A]*
>
> *One girl who wants to be a carpenter, also a senior, said, "I don't know how you get an apprenticeship. I may just have to get a shit job until I get a chance to get some training." [girl in A]*
>
> *One junior who is interested in electronics said, "Well, I like computers but I'm not sure what I'll do after high school." [boy in A]*

Lack of Sense of Economic Realities

Many students lack a sense of economic realities which could inform their choice of careers and help them make reasonable plans for further education and training after high school. Girls seemed unaware of salary or promotion prospects of traditional careers for women and less concerned with economic realities than boys.

Some students said they had no idea what they were going to do when they graduated. While this was not surprising for students in the 9th and 10th grades, quite a few 11th and 12th graders said the same thing. While some students may need time and experience out of school before they are able to figure out what they want to do with their lives, they were often very unrealistic about the options available to them. They didn't want to acknowledge that the kind of jobs you can find with a high school diploma are very limited in terms of salary and promotion prospects.

When asked how they will support themselves after high school, the most common answer was, "I'll get a job". But following up with questions about what kind of job and how students expect to set up on their own often drew a shrug or the assurance that, "I'll manage". Students who said they wanted to "take a year off" rarely had any plans about what they would do with that year or what kind of experience they hoped to gain.

The lack of a sense of economic realities was not confined to students who didn't know what they wanted to do after high school. Students who planned to enter college or some further training had often not considered either how they would finance that education, or the economic consequences of choosing particular careers.

While both boys and girls said they wanted a job that pays well, girls were more likely to stress interest and enjoyment of the work than monetary rewards, to the extent that some girls seemed insulted at the implication that they would choose a career because it paid well.

> *"I don't think we should worry if other jobs pay more. It is more important to do what you like and to enjoy your job than worry about money." [girl in A]*

In contrast, boys spoke more often of money as the motivating force behind career decisions.

> *"I'm going to college and I'll major in business...the first word out of my mouth was money." [boy in A]*

Girls interested in traditional careers often had little sense of relative salaries, particularly in service occupations. In one English class, for example, two girls were interested in the travel industry. They seemed particularly attracted to the chance for free travel and expected such jobs to be exciting.

> *"I heard travel agents are sent off on trips every few months. They make somewhere in the $20,000 range...it's a good salary if you include the free travel." [girl in A]*

Both boys and girls tended to think that girls would be less likely to work full time or be the sole support for their families. When we asked girls about salary or promotion prospects for various kinds of jobs, they seemed less concerned with economic realities than the boys. These findings were supported by the results of the quiz.

Lack of Accurate Information About Work and Wages

The quiz results demonstrate that boys and girls share misconceptions about how long women are likely to spend working, the level of earnings they can expect, and the relative salaries of traditional jobs for women.

We were particularly interested in whether students had a sense of the economic realities facing women in the work force. We decided to give all the students a quiz before the interviews which would test their knowledge of such issues as the relative salaries of male versus female dominated occupations, the number of women in the work force, etc.

We gave the quiz to all the classes which we visited as well as other classes taught by the teachers involved in the project. A total of 516 students in both academic and technology education classes took the quiz, including 320 boys and 196 girls [See Appendix A for quiz and summary of results].

The results of the quiz indicate that neither boys nor girls are well informed about the economic realities facing women in the work force. For most questions, the most popular answer chosen by students was incorrect. On question #1, for example, only 28.3% of students chose the correct answer that 9 out of 10 young women in high school today will work for pay outside their homes at some point in their lives. The most popular answer was 7 out of 10 young women, chosen by 42% of students.

On question #5, 36% of students thought that an average 20 year old woman can expect to spend an average of 18 years in the labor force, while 33.9% chose the correct answer of 29 years. Students underestimated the percentage of people living in poverty who are female and overestimated the number of women working in nontraditional jobs.

Question #6 gave students a choice between two occupations and asked them which earns more money. Students consistently picked the female-dominated occupation more often than the male-dominated one, despite the reality that, in general, brick layers earn more than registered nurses, mail carriers earn more than kindergarten teachers, stock clerks earn more than bank tellers and warehouse workers earn more than secretaries.

There were not a lot of differences between boys and girls on this question, with the exception of the first pairing, where boys were more realistic about the relative earnings of brick layers and nurses. There were 59.2% of girls compared to 49.4% of boys who thought nurses earned more.

Looking at the overall results, it appears that most students did not have a clear sense of the right answer and a lot of guessing was going on. The pattern is a relatively equal distribution of answers between the three possibilities. No answer for any of the eight questions was picked by more than 60% of students, even for question 6, which had only 2 possible answers (all the other questions provided 3 possible answers).

For two questions, the most popular answer was correct. Question #4 pointed out that 98% of employed dental assistants are women; it asked what percent of dentists are women? There were 50.4% of students who picked the correct answer of 8.5% female dentists, with the next most popular answer of 12.3% female dentists chosen by 33.1% of students. The most popular answer for question #2 was also the correct answer.

In general, older students were slightly better informed than younger students, but the differences in terms of age were not striking. 11th and 12th graders tended to pick the right answer slightly more often than 9th or 10th graders.

The quiz results demonstrate that boys and girls share misconceptions about how long women are likely to spend working, the level of earnings they can expect, and the relative salaries of traditional jobs for women.

Lack of Connection Between Vocational Electives and Careers

Students often failed to make the connection between what they were doing in class and technological careers. Most students had no opportunities to get work experience related to their career choice. Girls had little contact with female role models who could give them information about technological careers and break down stereotypes.

As discussed in earlier sections, even students taking technology education did not necessarily see the connection between what they were doing in class and technological careers. This lack of connection between vocational electives and careers was noticeable in all the high schools we visited.

Since vocational subjects tended to be lumped in with all electives, including study hall, gym and fine arts subjects, many students seemed unaware that classes in technology education, food service, or medical careers were supposed to offer them the chance to explore career options.

> *In one English class, 3 of the girls were taking culinary classes, although none were interested in a career in the foods industry. One of the girls would have preferred technology education as an elective because she wants to be a computer technician, but she was assigned culinary. One boy in the class wants to be a chef, but he was not taking a culinary class. [boys & girls in A]*

This example comes from the high school where students have almost no choice of electives, as witnessed by one girl who is taking band as an elective. When asked what instrument she played, she said she doesn't play anything, "...I just don't go." [girl in A]

Even in high schools where students have more choice, only a few students said they picked vocational electives because they were interested in a career in that area. When asked what kind of advice they got from guidance counselors, many students said the counselors were more interested in college requirements and left the choice of electives up to the students.

> *"They just ask you what you like, like what kind of classes you're interested in, and they usually sign you up for the classes you need and then you only have one extra period and you can take study hall or a language." [girl in A]*

> *"She just wants to know where I'm applying to college. When I told her I'm going to take a year off she gave me a hard time." [girl in A]*

Students sometimes mentioned a lack of information about what electives are available and how they relate to careers. In one history class, we asked the girls what would make technology education more attractive as an elective.

> *"If they told us what it's about."*
>
> *"If you knew more about it. In the handbook it doesn't say much."*
>
> *"If someone who took the class would come in and talk." [girls in A]*

We asked students about work experience or job shadowing programs which might provide them with the opportunity to explore careers. Very few students said they were offered such opportunities. Most students did find part-time work on their own, but it was usually not related to their career interests.

Some students reported getting information about careers from parents, relatives, or friends in the work force. Students who told us they had helped a parent or family friend on the job got the chance for first hand experience. Others received valuable information from relatives or friends.

> *One boy who wants to be an engineer said, "My family has a lot of engineers and I've talked to them about the best schools to apply to..." [boy in A]*
>
> *One boy said his father told him, "Don't be an ironworker because you risk your life all the time." [boy in A]*
>
> *One girl said, "My stepfather taught me how to do wiring and got me interested in tech ed...my real father would never have let me help." [girl in A]*
>
> *One girl said her boyfriend convinced her to go to college. "He told me I would wind up in a dead end job." [girl in A]*

Parents, relatives, and friends clearly play a critical role in advising students about career options. This is reinforced by our discussions with students who had little or no idea of what they would do after finishing school. Many of these students, particularly the juniors and seniors, had not talked to their parents about the future.

V. CONCLUSIONS

Looking at the factors which discouraged both boys and girls from taking technology education, we found that many of these factors had a particularly strong impact on girls. The lack of knowledge of technological careers, the failure to connect what students were doing in class with future careers, and the lack of a sense of economic realities were particularly discouraging to girls because they had less information about technology from experiences outside of school. Even more important, they had to overcome stereotypes about "appropriate" careers for women.

We found a major difference in attitude between girls who choose to take technology education and those who do not. Only a few girls are willing to be "pathbreakers" and challenge stereotypes about nontraditional careers for women. Most girls could not picture themselves in technological jobs and were reluctant to be in classes where they were one of the few girls.

Most of the girls we interviewed had never seriously considered taking technology education in high school. In addition to the difficulty of challenging stereotypes, the evidence of peer pressure and sexism among middle school students, which we documented in *Building Their Future I*, had already done its damage by discouraging most girls from considering nontraditional options by the time they reached high school.

The fact that most girls could not picture themselves in technological jobs reflects the barriers set by sexism and the failure of schools to provide role models and positive programs to overcome stereotypes. If we look only at the interviews with girls taking technology education, we might conclude that everything is fine and girls are doing well. However, the real picture is revealed in the enrollment numbers, which are reinforced by our interviews with girls not taking technology education. As long as participation is limited to a few girls willing to be "pathbreakers", the critical mass needed to convince the majority of girls that technology education is really for them will not be reached.

VI. RECOMMENDATIONS

Strategies designed to attract a sufficient number of girls to technology education in order to reach a critical mass will need to attack the problem from as many different directions as possible. Action needs to be taken not just by technology education teachers but in cooperation with administrators, guidance counselors and parents.

Because stereotypes about appropriate subjects or careers for women are still powerful, schools need to provide better information to all students about the options for technological careers and the role women can and do play in such occupations. Teachers and guidance counselors need to help students make the connection between what they are doing in class and the world of work. Students need to learn about economic realities while still in school.

The research results clearly show that girls are not well informed about what in technology education classes are available before they have to choose electives. Because they have less experience with technology outside of school and they must fight gender stereotypes, girls need encouragement from teachers and guidance counselors and more detailed information about what is available.

A coordinated strategy could include:

Scheduling Changes

Efforts should be made to maximize the number of girls in technology education classes. The current random distribution of girls in technology education classes could be examined in order to schedule as many girls as possible in one class. Once numbers reach 3 or 4 girls in a class, other girls may feel more comfortable taking technology education.

Better Information For Students About What Is Available In High School

- *Middle schools/guidance counselors should schedule visits to high school technology education labs to see the kind of work being done with participation by high school girls who are currently taking these classes (using "pathbreakers" as role models).*

- *Schools should hold elective fairs with the participation of high school teachers and students (particularly girls) to inform middle school students about the kind of programs which will be available to them.*

- *Schools should sponsor product shows which display the kind of projects students can create in technology education classes.*

Role Models For Girls In Technology Education

In both middle school and high school, girls need to meet and talk to successful women who work in technological fields.

- *Technology education teachers should arrange for successful women in nontraditional fields to visit their classes and talk about their jobs and the kind of preparation and training they needed.*

- *Careers days or programs presented by schools must be designed to include women in nontraditional occupations.*

- *High Schools should provide more opportunities for high school students to participate in job shadowing or work experience. Programs with local employers in technological fields could be designed to allow girls to meet successful women and learn more about technological careers.*

- *Schools should make a greater effort to hire female technology education teachers or develop team teaching programs with female teachers in math or science.*

Strategies For Teachers

Technology education teachers need to meet together and discuss strategies to attract more girls to their classes. These strategies could include curriculum revisions or reorganization of labs. Teachers may need to attend training sessions or obtain new materials.

- *Technology education teachers should provide more information to students about careers in technological fields and help them make the connection between what they do in class and the world of work. Materials which highlight the contribution of women in technological fields must be incorporated into the curriculum.*

- *Teachers in the social sciences need to teach students more about economic realities, particularly about the role of women in the work force. Students need to learn about the economic consequences of choosing careers and the relative salary and promotion prospects of different occupations. Programs should be developed in cooperation with guidance counselors.*

- *Technology education teachers should try to make their classrooms more attractive and welcoming to girls. Pictures showing women working in technological jobs and products made by female students could be displayed in the classroom. Teachers should consider a forum where girls taking technology education could talk to prospective students considering what electives to choose. Support groups for girls in technology education should be organized.*

Strategies For Guidance Counselors

Guidance counselors must provide more information to students about what electives are available and how they might fit in with various career options. Girls need to be encouraged to consider taking technology education, particularly if they are not sure whether to go to college, or express interest in engineering or a technological career.

- *Guidance counselors should meet with technology education teachers to learn more about what is available in their classes.*

- *Guidance counselors should organize programs for students who do not plan to go to college to give them a chance to explore different options and obtain more information about further education and training. These programs should include information about nontraditional careers for women and/or the participation of women as role models. They could also include the participation of parents and/or relatives.*

APPENDIX A

QUIZ FOR HIGH SCHOOL STUDENTS
With Distribution of Answers in Brackets

1) Out of every ten young women in high school today, ___ will work for pay outside their homes at some point in their lives.

a. nine	b. five	c. seven
[correct: 28.3%]	[29.6%]	[42.0%]
[boys: 24.5%]	[boys: 31.5%]	[boys: 43.9%]
[girls: 34%]	[girls: 26.1%]	[girls: 39.8%]

2) What percent of today's families fit the model of the father working and the mother at home with two children?

a. 12 percent	b. 4 percent	c. 20 percent
[34.9%]	[correct:38.4%]	[26.2%]
[boys: 33.8%]	[boys: 35.0%]	[boys: 30.9%]
[girls: 38.2%]	[girls: 42.9%]	[girls: 18.3%]

3) In 1992, women earned ___ cents for every dollar earned by men.

a. 71 cents	b. 83 cents	c. 59 cents
[correct:33.5%]	[29.8%]	[36.4%]
[boys: 30.3%]	[boys: 32.2%]	[boys: 37.5%]
[girls: 39.3%]	[girls: 25.1%]	[girls: 35.6%]

4) 98 percent of employed dental assistants are women; what percent of dentists are women?

a. 21.4 percent	b. 8.5 percent	c.12.3 percent
[15.7%]	[correct:50.4%]	[33.1%]
[boys: 18.7%]	[boys: 50.6%]	[boys: 29.9%]
[girls: 11.5%]	[girls: 49.7%]	[girls: 38.7%]

5) An average 20 year old woman can expect to spend an average of ___ years in the labor force.

a. 10	b. 18	c. 29
[29.1%]	[36.1%]	[correct:33.9%]
[boys: 31.2%]	[boys: 37.3%]	[boys: 31.5%]
[girls: 25.1%]	[girls: 35.6%]	[girls: 37.6%]

6) Who earns more?

registered nurse	or	brick layer
[52.5%]		[correct:33.9%]
[boys: 49.4%]		[boys: 38.2%]
[girls: 59.2%]		[girls: 27.2%]
kindergarden teacher	or	mail carrier
[47.5%]		[correct:38.2%]
[boys: 47.5%]		[boys: 38.9%]
[girls: 48.2%]		[girls: 37.7%]
bank teller	or	stock clerk
[47.9%]		[corrrect:37.0%]
[boys: 49.7%]		[boys: 36.9%]
[girls: 45.5%]		[girls: 38.7%]
secretary	or	warehouse worker
[59.5%]		[correct:25.8%]
[boys: 59.9%]		[boys: 26.8%]
[girls: 60.2%]		[girls: 24.1%]

7) Men made up ___ of all people over 18 years of age whose incomes were below the poverty level in 1991.

a. 27 percent	b. 35 percent	c. 50 percent
[correct:28.5%]	[47.7%]	[22.5%]
[boys: 29.6%]	[boys: 41.4%]	[boys: 28.0%]
[girls: 27.2%]	[girls: 58.6%]	[girls: 12.6%]

8) What percent of working women worked in nontraditional jobs in 1992?

a. 15 percent	b. 25 percent	c. 30 percent
[correct:23.8%]	[47.5%]	[26.7%]
[boys: 26.4%]	[boys: 43.9%]	[boys: 27.7%]
[girls: 20.4%]	[girls: 53.4%]	[girls: 24.6%]

APPENDIX B

ENROLLMENT IN TECHNOLOGY EDUCATION

Program	Males	Females	Total Enrollment	Percentage Female
Construction	5,138	1,044	6,182	16.8
Transportation Power & Engineering	435	306	4,657	6.5
Communication	8,626	2,624	11,250	23.3
Manufacturing	2,908	738	3,646	20.2
Carpentry	542	22	564	3.9
Auto Repair	752	32	784	4.1
Graphic Communication	696	214	910	23.5
Machine Tool	838	82	920	8.9
Welding	134	7	141	4.9
TOTAL	23,985	5,069	29,054	17.4

Source: State Department of Education, Bureau of Evaluation and Student Assessment, CVEIS Tables for 1990-1991.

APPENDIX C

INTERVIEW SCHEDULE

Focus Group Interviews with High School Students

Start with introductions, beginning with the researcher and short description of the project.

Key Areas for Discussion

1. Have you decided what kind of career you want when you finish school?

   - Go around the room and get each student to answer individually, first introducing themselves.

   - Follow up with questions about the necessary preparation, salary and promotion prospects of different kinds of careers.

2. What subjects do you like best?

   - Are some harder or more interesting than others?

   - How do you feel about technology education?

   For those taking tech ed
   - are you good at tech ed?
   - why are you taking it (do you want a career in technology?)
   - who encouraged or discouraged you from taking tech ed?
   - what did teachers and guidance counselors say?
   - how did you like your tech ed classes in middle school?
   - do teachers treat boys and girls the same?

   For those not taking tech ed
   - did you consider taking tech ed?
   - did anyone encourage or discourage you from taking tech ed?
   - what would make tech ed more appealing?
   - how did you like your tech ed classes in middle school?

   - How do you feel about health-related subjects? Math and science?

3. Are some careers more for girls than boys?

   - Ask about nontraditional careers, such as engineers for girls or nurses for boys, try to bring in students who do not volunteer by asking them if they would consider such careers.

   - How do they feel about technological careers, like architecture or engineering? How much preparation would they require, how good are salary prospects?

4. Do you think that boys are better at some subjects than girls?

   - If so, are they just born that way?

   - Are girls who are good at math, science and technology regarded as strange?

5. Who do you talk to about the future?

   - Do your friends or family give you advice?

   - Do teachers or guidance counselors give you advice?

   - Who do you think you should listen to?